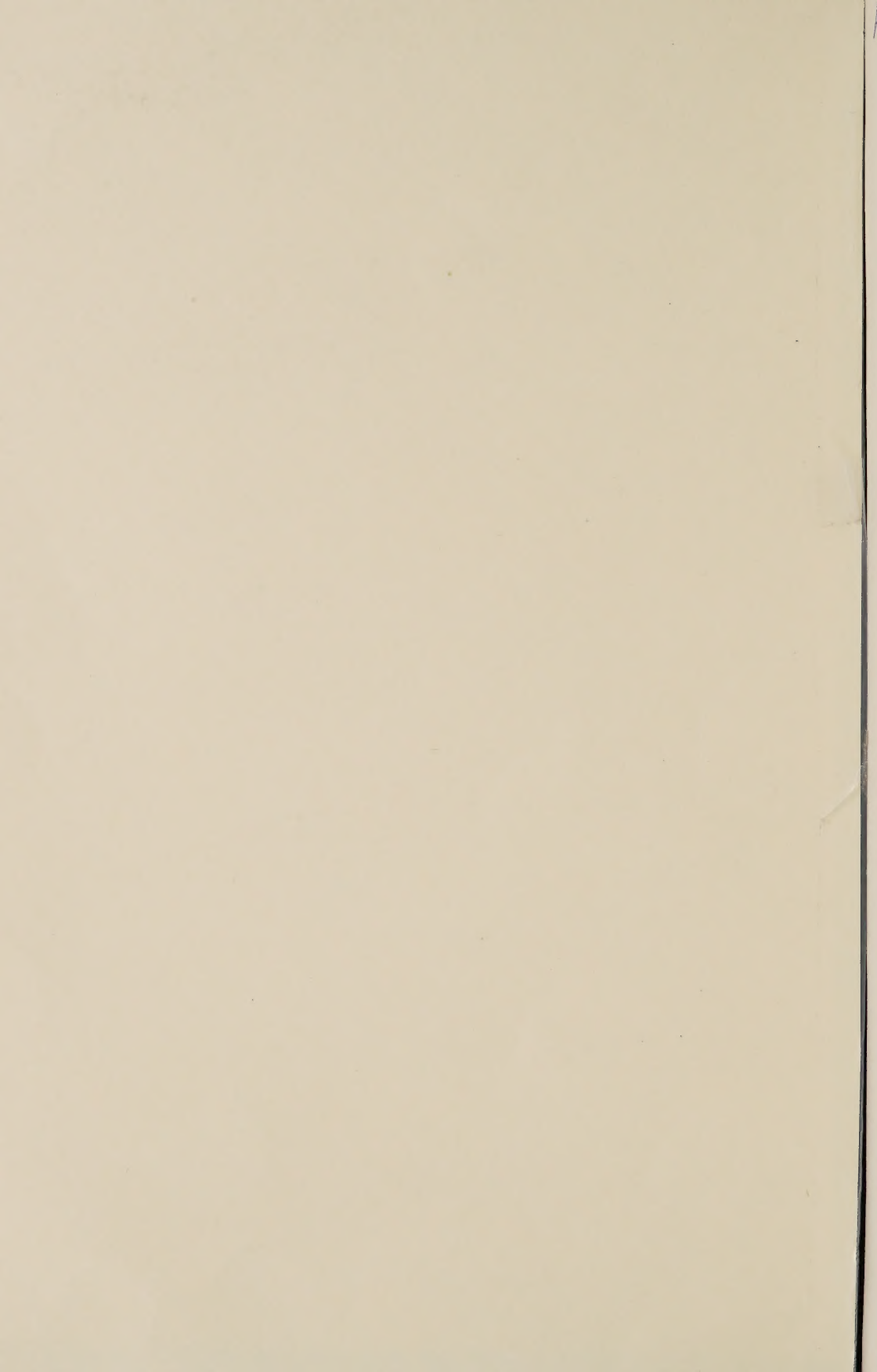


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# White-Pine Weevil

By H. J. MacAloney<sup>1</sup>

The white-pine weevil, *Pissodes strobi* (Peck), is a native insect that occurs throughout the range of eastern white pine. It is the most serious insect pest of this tree species. A large percentage of the white pines in natural stands and plantations have been attacked one or more times. The crook or fork deformations that result from the attack greatly reduce the value of the lumber (figs. 1 and 2).

Norway spruce plantations also have been severely attacked by the weevil in the East, particularly in the Adirondacks. In the Lake States, jack pine plantations are vulnerable too.

## Host Trees

Tree species damaged by weevils may be grouped as follows:

<i>Severely attacked</i>	<i>Commonly attacked</i>
eastern white pine	pitch pine
Norway spruce	red pine
jack pine	Japanese red pine
	western white pine
	limber pine
	foxtail pine
<i>Occasionally attacked</i>	<i>Rarely attacked</i>
Scotch pine	Himalayan pine
western yellow pine	blue spruce
mugho pine	white spruce
red spruce	Austrian pine
	Douglas-fir

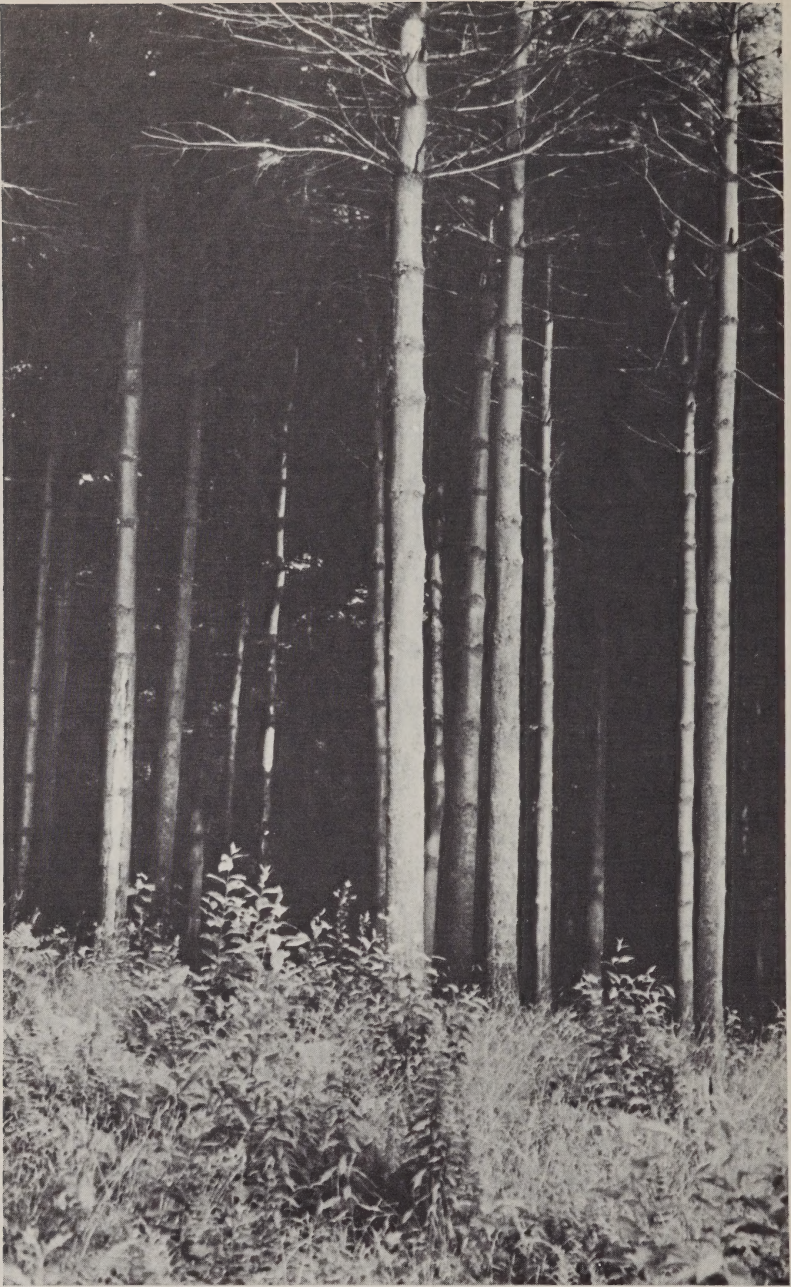
<sup>1</sup>Principal entomologist (deceased), North Central Forest Experiment Station. The station is maintained at St. Paul, Minn., by the Forest Service, U.S. Department of Agriculture, in cooperation with the University of Minnesota.

## Evidence of Infestation and Damage Caused

The first evidence of attack in the spring is the appearance, on the preceding year's terminal shoot, of tiny glistening droplets of resin, exuding from holes made by the adult weevils in feeding. Larvae feeding in the leader cause the new shoot of the current year's growth to wilt and turn brown (fig. 3). This is usually noticeable by early June in the southern part of the white pine range and progressively later toward the north. Two years' growth is killed, often three, and occasionally four. Jack pine often loses only 1 year's growth because the eggs are laid in the current season's leader after height growth is well established. One of the lateral branches in the whorl below the dead leader usually assumes the role of leader, and a crook in the main stem results. Sometimes two or more laterals will compete for leadership, and a forked tree will result.

Weevil injury reduces the merchantable height. The end result is volume loss, which may be as high as 13 percent in pole-size trees, 40 percent in the sawlog portions of sawtimber trees, and 70 percent in those portions of sawtimber trees above sawlog limits.





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Figure 1.—To see how the white-pine weevil affects the quality of white pine timber, compare the tall straight stems of this undamaged stand with the stand shown in figure 2.





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**Figure 2.**—These white pines have been deformed by weevil attacks. When the weevils kill the leaders, the trees grow up crooked and forked.





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**Figure 3.**—The wilting top of this white pine is the most conspicuous early evidence of attack by the white-pine weevil.

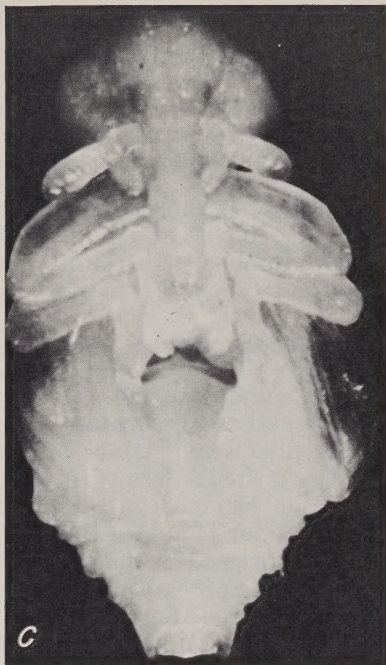
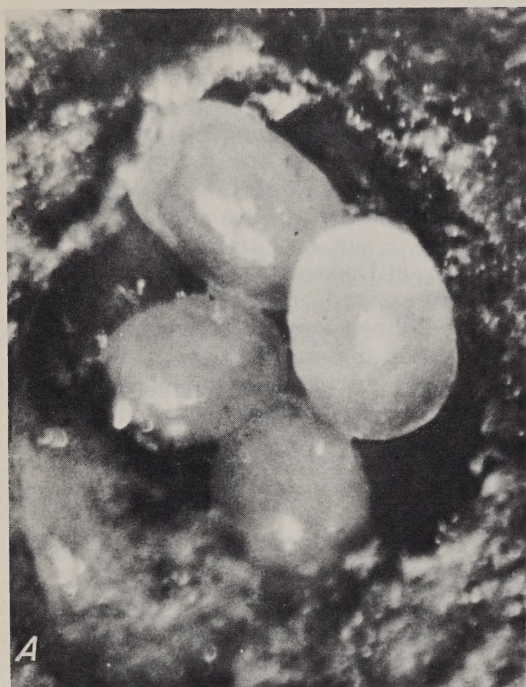
## Description of Stages

The adult weevil (fig. 4, *D*) is an elongate, brownish snout beetle, about one-fifth of an inch long, and marked with irregular small patches of grayish-white and yellow scales. The pearly-white eggs are about one twenty-fifth of an inch long (fig. 4, *A*). The larvae are white, cylindrical, and footless (fig. 4, *B*); when full grown, they are slightly longer than the adults. The pupae are mostly creamy white and the same length as the adults (fig. 4, *C*).

## Life History

The white-pine weevil passes the winter in the adult stage in the litter and resumes activity from March to May, depending on locality. The eggs, which are laid in small punctures in the bark of the leader, hatch in a week to 10 days. The grubs, boring downward in a ring, feed on the inner bark and the outer surface of the wood as they girdle and kill the shoot. By late July the larvae become full grown, change to the pupal stage, and in





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Figure 4.—White-pine weevil. A, Eggs laid in a puncture of the bark. Eggs are about one twenty-fifth of an inch long. B, Larva, slightly longer than adult. C, Pupa, same length as adult. D, Adult, about one-fifth of an inch long.



10 to 15 days become adult weevils. Adult weevils emerge from the leaders from late July until early fall.

## Natural Control

Insect parasites and predators, and also birds, at times destroy a great number of weevils, but not enough to control this pest.

## Direct Control

*Knapsack spraying.*—Trees up to 16 feet tall can be protected against white-pine weevil attack by drench-spraying the leaders with a lindane emulsion fortified with 8 ounces of the extender Pinolene 1902 per gallon of spray. For fall spraying—from mid-September until winter weather hinders fieldwork—a 1-percent emulsion (6.4 ounces of 20-percent lindane emulsifiable concentrate per gallon of spray) is recommended.

For spring treatment—mid-March through April—the lindane should be reduced to one-half percent (3.2 ounces). Aroclor 5460 can be used as the extender at the rate of 1 part to 1 part insecticide. Pinolene is more readily available in small amounts, does not require a solvent, and when mixed with lindane concentrate, will permit precipitation of the lindane at temperatures well below freezing. Lindane and Aroclor, applied in the spring by knapsack mistblower at the rate of 1 pound of each in 2 gallons of spray per acre, has also proved effective.<sup>2</sup>

A concentrated lead arsenate spray applied by knapsack sprayer to trees up to 16 feet tall is also an effective control agent. To make 5 gallons of spray solution, measure 1½ gallons of water and stir after adding each of the following:

2 ounces (dry weight) of a household detergent as a spreader, 4 pounds lead arsenate, 20 fluid ounces of linseed oil as a sticker, and water to make 5 gallons. Strain the solution into the spray tank. Using a very fine nozzle, drench-spray the upper half of each leader. Treatment can be carried out any time from December until the buds begin to expand, usually about May 1.

Three-percent emulsions of heptachlor and endrin, the latter fortified with an extender such as Aroclor 5460 (1 part extender to 1 part insecticide), will also control the weevil. These materials should be used only from mid-March through April.

A young plantation should be watched closely for evidence of attack, which usually begins when the trees are 2 to 3 feet tall. The decision to carry out control measures depends on: (1) Objectives of stand management—the economic considerations and expected returns—and (2) the present conditions of the stand—specifically the current number of weeviled trees and the rate of increase in their numbers. When to start control measures and how often to repeat them also depends partly on the growth rate of the trees. Generally speaking, treatment should begin when 2 to 5 percent of the trees are weeviled in any 1 year. When 10 percent of the trees are weeviled in one season, another treatment should be applied to prevent a rapid buildup of the weevil and loss of good treetops. There is usually a 3- to 6-year period before weeviling approaches the 10-percent point and another 6 to 12 years of protection following the two treatments. At the end of the period, there will be enough trees with straight 16-foot butt logs to form a well-stocked stand.

*Aircraft spraying.*—DDT applied by aircraft has given good control. However, in view of the danger to fish and wildlife, this

<sup>2</sup> These are unpublished recommendations by the Bureau of Forest Pest Control, New York Conservation Department, Albany, N.Y.



measure is no longer advised. As yet, tests with other insecticides not toxic to fish and wildlife have not been successful.

**Caution:** Pesticides are poisonous; handle and apply them with care. Follow the directions and all precautions given on the container label. If pesticides are handled or applied improperly or if unused portions are disposed of improperly, they may be injurious to humans, domestic animals, honeybees or other pollinating insects, fish, and wildlife. Also, they may contaminate water supplies.

## Indirect Control

The white-pine weevil tends to fly above the general canopy or the height level of a stand, and thus trees taller than the average are more likely to be attacked. For this reason damage by the white-pine weevil is less severe in natural stands where the susceptible host is growing in mixture with overtopping hardwoods. Planting the susceptible host under a light hardwood cover will also tend to reduce the severity of attack. White pine should be planted only on medium soils where it will not suffer by competition with other trees. Weedings, if the susceptible trees are mixed with hardwoods, will be necessary when the trees are young to prevent whipping, which can be as serious as successful weevil attack. To foster optimum growth of the crop trees, thinnings will be necessary as the stand or plantation becomes established.

In heavily infested sapling-size pure plantations or natural stands,

the least injured trees should be selected for the final crop with due regard for spacing and dominance. The quality of these trees can be improved by pruning the boles to a height of 16 feet and their growth favored by girdling, cutting, or poisoning the less desirable heavy-crowned, severely weeviled trees.

## References

Portable mistblower spray tests against white pine weevil in New York. DONALD P. CONNOLA. J. Forest. 59: 764-765. 1961.

Concentrated lead arsenate spray for control of white-pine weevil. DAVID CROSBY. J. Forest. 48: 334-336. 1950.

The white pine weevil (*Pissodes strobi* Peck)—its biology and control. HARVEY J. MACALONEY. N.Y. State Coll. Forest. Bull. 3(1) Tech. Public. 28, 87 pp., illus. 1930.

Evaluating and scheduling white-pine weevil control in the Northeast. ROBERT MARTY and D. GORDON MOTT. U.S. Forest Serv. Res. Pap. NC-19, 56 pp., illus. (Northeast. Forest Exp. Sta., Upper Darby, Pa.) 1964.

Loss in volume of white pine in New Hampshire by the white-pine weevil. W. E. WATERS, T. MCINTYRE, and D. CROSBY. J. Forest. 53: 271-274. 1955.

The effect of weather and the physical attributes of white pine leaders on the behavior and survival of the white pine weevil, *Pissodes strobi* Peck. C. R. SULLIVAN. Canad. Entomol. 91: 213-232, illus. 1959.



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